

Certification/Licensing Approaches for High Burnup Spent Fuel

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Overview

- Purpose
- Storage
 - Regulatory Requirements and Guidance
 - Certification/Licensing Approach
- Transport
 - Regulatory Requirements and Guidance
 - Certification Approach
- · On-going Research and Other Activities
- Summary

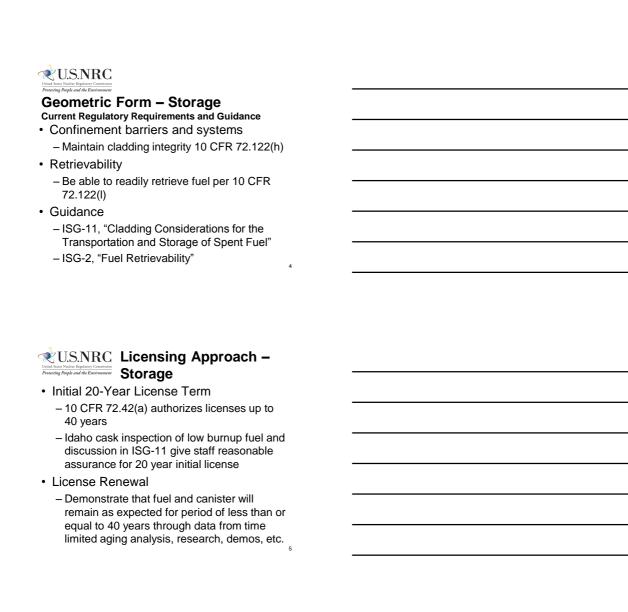
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Purpose

 Develop certification/licensing approaches for high burnup spent fuel storage and transportation applications while on-going research and other activities continue

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Canister Qualification for Storage

- Appropriate learning aging management program and inspections/tests of canisters if relied on as a component important to safety
- Conservative assumptions with respect to canister behavior under accident conditions

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Geometric Form – Transport

Current Regulatory Requirements and Guidance

- · Normal Conditions of Transport:
 - geometric form of the package contents would not be substantially altered per 10 CFR 71.55(d)(2)
 - Loading/Unloading procedures per 10 CFR 71.89

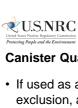


Certification Approach – Normal Conditions of Transport

- Verify assembly condition, if not canned, at the time of loading
- Evaluate fuel structural performance using best estimate materials data
- Evaluate thermal, containment, shielding, and criticality safety requirements assuming worst credible fuel configuration (defense in depth)
- Verify loading/unloading safety requirements and procedures based on fuel conditions after transport to meet 71.89



- · Hypothetical Accident Conditions:
 - fissile material evaluated in the most reactive credible configuration per 71.55(e)
 - Certification approach already developed and historically used
- Guidance
 - ISG-19, "Moderator Exclusion Under Hypothetical Accident Conditions and Demonstrating Subcriticality of Spent Fuel Under the Requirements of 10 CFR 71.55(e)"



Canister Qualification for Transport

- If used as a second barrier for moderator exclusion, appropriate tests and analyses are needed to determine canister condition prior to transport
- Conservative assumptions with respect to canister behavior under accident conditions

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On-Going Research and Other Activities on High Burnup Fuel

- Vibration tests for Normal Conditions of Transport
- Bend tests to characterize cladding properties
- Fuel reconfiguration consequences evaluation
- · High Burnup Dry Storage Cask Demo
 - Licensees expected to monitor and take appropriate action
 - NRC will monitor results

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Summary

- Certification/licensing approach necessary to address current high burnup fuel applications.
- Licensees will be expected to monitor research and other activities to determine applicability.
- Approving high burnup fuel for storage and renewal beyond 20 years.
- Defense in depth, operational controls, oversight and inspection have significant role in certifying high burnup transportation packages

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